

## ON RHOPALOPSYLLUS BAKER 1905 (SIPHONAPTERA).

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(With 10 text-figures.)

SINCE the publication of the survey of *Rhopalopsyllus* Baker 1905 in *Ectoparasites*, pp. 320-351 (1923) a considerable number of new species have been described, and it is to be expected that many more will be discovered. In these circumstances it is advisable to treat the three natural groups into which we divided the genus in 1923, *l.c.*, as different genera, our expectation expressed *l.c.* that the discovery of new species would fill the gaps between the three sections not having come true.

1. *Rhopalopsyllus* Baker 1905; genotype: *Pulex lutzi* Baker 1904.

*Rhopalopsyllus* Baker, *Proc. U.S. Nat. Mus.*, xxix, pp. 128-130 (1905) (partim; *lutzi* designated genotype).

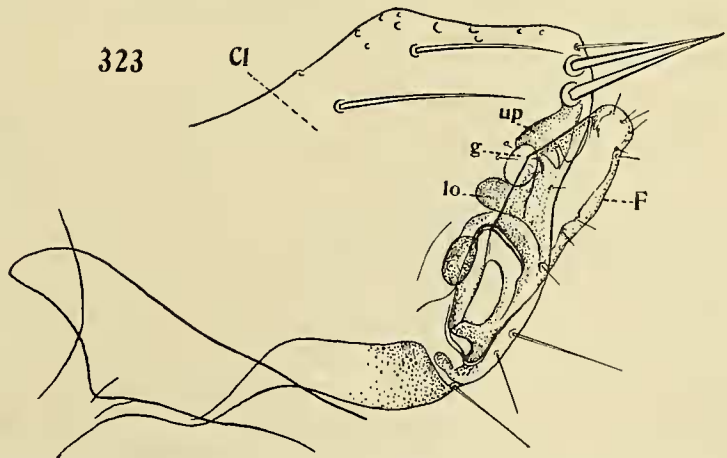
*Rothschildella* Enderlein, *Zoolog. Anzeiger*, xl., p. 72 (1912) (genotype: *cryptoctenes* = *lugubris*); Jord. & Roths., *Ectoparasites*, p. 320 (1923) (*Rothschildella* = *Rhopalopsyllus*).

The diagnosis given in *Ectoparasites* for Section A reads as follows: "Bristles of anterior row on frons weak, except upper bristle. Prosternum anteriorly extending downwards as a rounded projection. Mesosternum as high as long. Fourth hindtarsal segment short, very strongly dilated apically, fifth of all tarsi long, in hindtarsus longer than second midtarsal segment. Anterior dorsal margin of pygidium strongly projecting."

In none of the species is the body of the spermatheca humped. The phallosome is characteristic, as explained below.

The most widely distributed species is *Rh. australis* Roths. 1904, occurring in several subspecies

from Mexico to South-East Brazil. A series of Brazilian specimens of this species lately received for determination from Dr. Fred L. Sloper, Rockefeller Foundation, Rio de Janeiro, calls for a remark on the variability of a minute subspecific distinction. In the males from Anapolis, Goyaz (Rockefeller Foundation) and from São Paulo (Tring collection) the lower internal incrassation of the posterior margin of the clasper (text-fig. 323, lo; specimen from S. Paulo) is smaller than the upper incrassation (up). In typical *Rh. australis tomojus* J. & R. 1923 from Paraguay the lower incrassation is at least as large



as the upper. The material from Paraguay is not extensive enough for ascertaining whether this is always the case in that country (and Argentina, whence we have no examples of *Rh. australis*). The males from Santa Cruz de la Sierra, Bolivia, submitted by the Rockefeller Foundation, are more or less intermediate. For the present I look upon all these specimens as being *Rh. australis tomoyus*. In the S. Paulo specimen from which fig. 323 is taken the groove (g) of the clasper which corresponds to the angle of the anterior margin of the digitoid F is exceptionally large; as a rule the groove is about half the size as in the figure.

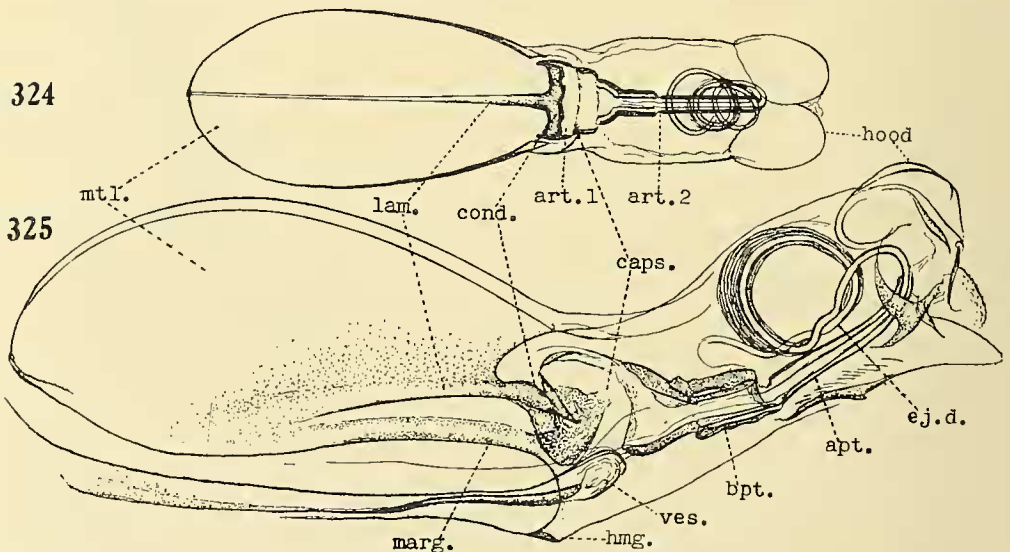
2. *Polygenis* gen. nov.; genotype: *Pulex roberti* Roths. 1905.

Prosternum not humped anteriorly between the coxae. Mesosternite (measured from anterior margin of sternum to apex of mesepimerum) longer than high. Tarsal segment V much smaller than in *Rhopalopsyllus*, that of hindtarsus not longer than midtarsal segment II.

Here belong the majority of the species now standing as *Rhopalopsyllus*. In most of them the body of the spermatheca is distinctly humped. We have selected *roberti* as genotype, because the species is easy to recognize; one of its main recognition characters, however, varies to some extent, which must be borne in mind: the subapical dorsal notch of the hindtibia usually bears three heavy bristles, but in one of our males there are only two in one tibia; in another specimen there is a strong dorsal bristle between the second and third pairs instead of a thin hair.

3. *Tiamastus* gen. nov.; genotype: *Pulex cavicola* Weyenb. 1881.

Proboscis extending to the apex of trochanter or beyond, whereas in *Polygenis* it reaches at most to the base of trochanter. Prosternum not humped

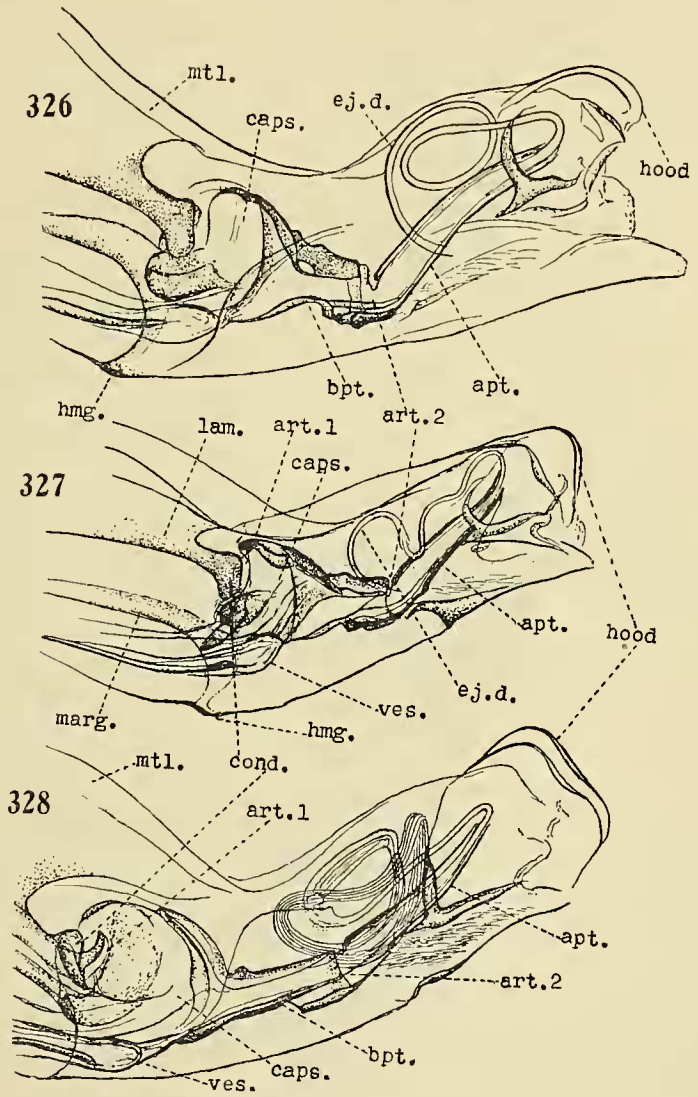


anteriorly between the coxae. Mesosternite longer than high. In ♂ posterior margin of clasper with subapical tooth below which there is a long submarginal bristle. In ♀ sternum VII with lateral sinus, and spermatheca with long nose.

Only a few species are known, in all of which the longest bristle of hind-tarsal segment II reaches to or beyond apex of IV : *T. cavicola* Weyenb. 1881, *T. callens* J. & R. 1923, *T. subtilis* J. & R. 1923 and *T. palpalis* J. & R. 1923.

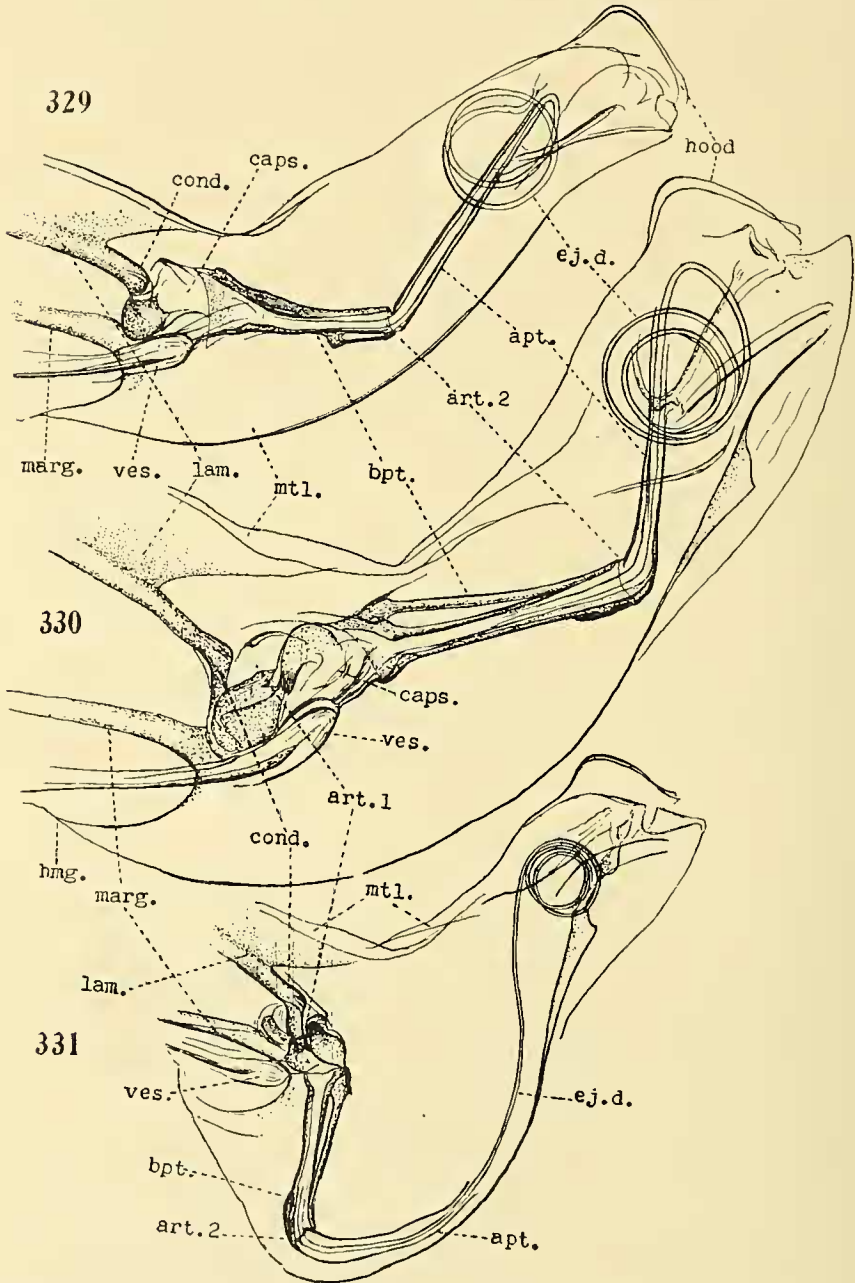
The species of the three genera have an interesting characteristic in common which does not seem to have been mentioned in the descriptions of these

fleas : the distinction is found in the sclerites which are accessory to the ductus ejaculatorius and form a compact body for which we accept the term phallosome introduced in the systematics of Diptera. The phallosome of **Rhopalopsyllus** resembles in dorsal aspect (text-fig. 324, *Rh. lutzi*) an elongate (very pale) cavernicole beetle with long prothorax, its outer covering, the mantle (mtl.), being divided into the apical hood, the median neck and the larger, elongate-ovate, anterior rump-cover. This rump-cover is open below and its margin, somewhat more strongly chitinized than the rest of the mantle, curves down and back and unites with the margin of the other side in a sort of heel (hmg.), similar to the



heel of sternum IX, the heel terminating the ventral mantle of the neck (text-fig. 325), but being continued forward by a tendon. The elongate rump-cover, which resembles the elytra of a beetle, is longitudinally marked with a suture. The cavity within this portion of the mantle is centrally divided by a lamina which is suspended from the suture and ends distally with a transverse bar (dorsal aspect), the bar appearing as a kind of condylus (cond.) in lateral aspect. The neck contains the strongly chitinized and long tube through which the ejaculatory duct passes distad. The proximal portion of the ejaculatory duct

which lies below the body of the mantle is supported by a long sclerite and forms a vesicle (ves.) before entering the tube. It is an interesting fact that the penis-tube consists in the three genera of two portions : a strongly chitinized basal segment (bpt.) and a narrow distal one (apt.), separated from each other



by a joint (articulation 2) ; the basal tube is also articulated (art. 1) with the condylus of the lamina, there being a cavity (caps.) between the condylus and penis-tube variously filled with ligaments and ossicles. There are some specific differences in the phallosomes of the four species represented by fig. 325 (*Rh. lutzi*), fig. 326 (*Rh. lugubris*), fig. 327 (*Rh. australis*) and fig. 328 (*Rh. cacticus*) ;

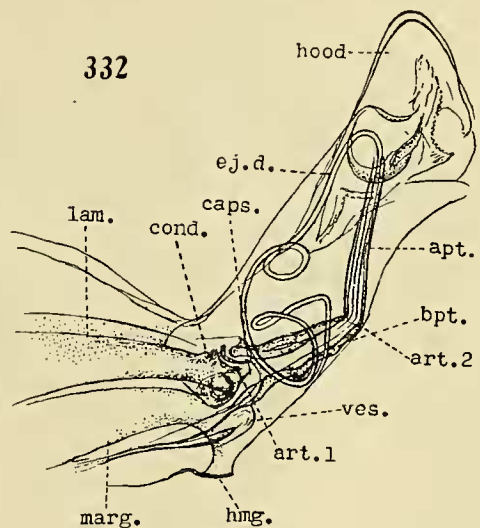
in *Rh. cacicus*, for instance, the basal segment of the penis-tube is longer than in the other species, the capsule is wider, the free distal portion of the duct is for the greater part enclosed in muscles and the heel (hmg.) is not thickened; in *Rh. lutzii* a portion of the apical duct also lies in a muscle, whereas in *Rh. lugubris* and *Rh. australis* the duct appears to lie free in the cavity of the neck, the dorsal membrane of which is thin and flexible. All four species have this point in common that the duct, on leaving the tube, turns dorsad in a lateral view as depicted. The free duct is more or less rolled up as a spiral except in *australis* and the position of the coil is variable. If the duct lies partly at the side of the tube before the specimen is cleared, the pressure of the coverslip may cause the beginning of the duct first to turn towards the ventral side instead of the dorsal one.

In *Polygenis* (text-figs. 329-331) the two segments of the penis-tube are usually longer than in *Rhopalopsyllus*, the basal segment being particularly long in *P. tripus* (text-figs. 330, 331). The pale space in the dorsal wall of the basal segment is very much longer in *P. tripus* (and *P. axius* J. & R. 1923) than in other species, as shown in the figures. The duct protruding from the tube turns ventrad and is coiled near the apex of the tube. Fig. 331 (less enlarged) represents a specimen of *P. tripus* in which the basal tube is turned ventrad. The heel is not inbrassate. Only *P. klagesi* is an exception as regards the free duct, agreeing in this particular with the next genus.

The phallosomes of the species of all *Tiamastus* resemble that of *T. cavicola* (text-fig. 332). The free duct turns dorsad as in *Rhopalopsyllus*, but is not rolled up, being long and extending forward to the base of the penis-tube, more or less as in the figure. The ventral heel (hmg.) of the mantle has a distinct incrassation, as in *Rh. australis*, *Rh. lugubris* and *Rh. lutzii*, more or less.

Although *P. klagesi* agrees best with *Polygenis*, it has much in common with *T. cavicola*. The long bristles of the hindtarsus are longer than in other species of *Polygenis*, as is the case with all *Tiamastus*, segment V of foretarsus is short and broad as in *T. cavicola*, and the ejaculatory duct turns dorsad on emerging from the tube (as in *Rhopalopsyllus* and *Tiamastus*) and extends forward to the basal segment of the tube, making a loop and a coil or two, but not being rolled up as in other *Polygenis*. There is no distinct heel to the mantle. The basal penis-tube is exceptionally short for a species of *Polygenis*. We observe in *P. klagesi* a mixture of somatics which suggests that we have here a side-line of development of which so far only this one representative is known.

With the exception of fig. 323, the illustrations are drawn from specimens mounted in balsam. The appearance of the detail in the composition of the



phallosome depends much on the method of clearing and mounting and the depth of the focus, particularly as regards the condylus and the contents of the capsule.

#### EXPLANATION OF THE TEXT-FIGURES.

- Fig. 323. *Rhopalopsyllus australis tomoyus* J. & R. 1923, São Paulo.—Cl, clasper ; up, upper incassation ; g, groove ; lo, lower incassation.
- Fig. 324. *Rhopalopsyllus lutzi lutzi* Baker 1904, phallosome extracted, dorsal aspect ; 100  $\times$ —mtl., mantle ; lam., lamina ; art. 1, first articulation ; art. 2, second articulation ; caps., capsule ; marg., ventral margin of mantle ; hmg., heel of mantle ; ves., vesicle ; bpt., basal segment of penis-tube ; apt., apical segment of penis-tube ; ej. d., ejaculatory duct.
- Fig. 325. *Rhopalopsyllus lutzi lutzi*, the same, lateral aspect as in all the following figures ; 180  $\times$ .
- Fig. 326. *Rhopalopsyllus lugubris* J. & R. 1908.
- Fig. 327. *Rhopalopsyllus australis lupinus* J. & R. 1923.
- Fig. 328. *Rhopalopsyllus cacicus saevus* J. & R. 1923.
- Fig. 329. *Polygenis roberti* Roths. 1905.
- Fig. 330. *Polygenis tripus* Jord. 1933 ; 180  $\times$ .
- Fig. 331. *Polygenis tripus* ; 105  $\times$ .
- Fig. 332. *Tiamastus cavicola* Weyenb. 1881.
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